

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device using a gallium nitride related semiconductor, comprising:

5 a step of preparing a substrate whose surface is formed by a gallium nitride related semiconductor;

a nitriding step of contacting the surface with atom-state nitrogen which is obtained by decomposing nitrogen-containing gas by means of a catalytic reaction, to thereby nitride the surface; and

10 an electrode forming step of forming, on the surface, a gate electrode and source and drain electrodes opposing each other through the gate electrode.

2. A method according to claim 1, wherein the nitriding step is a step at which the surface is
15 selectively nitrided, and

the electrode forming step is a step at which the electrodes are formed on the surface thus selectively nitrided.

3. A method according to claim 1, wherein the
20 nitriding step is a step at which an aluminum layer is formed on the surface and a surface of the aluminum layer is nitrided.

4. A method of manufacturing a semiconductor device using a gallium nitride related semiconductor, comprising:

25 a step of preparing a substrate whose surface is

formed by a gallium nitride related semiconductor;

a step of forming, on the surface, a gate electrode and source and drain electrodes opposing to each other through the gate electrode; and

5. a nitriding step of contacting the surface, at an area between the source electrode and the gate electrode and at an area between the drain electrode and the gate electrode, with atom-state nitrogen which is obtained by decomposing nitrogen-containing gas by means of a catalytic reaction, to thereby nitride the surface.

5. A method according to claim 4, wherein the nitriding step is a step at which an aluminum layer is formed on the surface and a surface of the aluminum layer is nitrided.

- 15 6. A method of manufacturing a semiconductor device using a gallium nitride related semiconductor, comprising:

a step of preparing a substrate whose surface is formed by a gallium nitride related semiconductor;

- 20 a step of forming, on the surface, a gate electrode and source and drain electrodes opposing each other through the gate electrode;

a step of forming an insulation or aluminum film so as to cover the entire surface; and

- 25 a nitriding step of contacting the surface, at an area between the source electrode and the gate electrode and at

an area between the drain electrode and the gate electrode, with atom-state nitrogen which is obtained by decomposing nitrogen-containing gas by means of a catalytic reaction, to thereby nitride the surface.

- 5 7. A method according to Claim 6, wherein the nitriding step is a step at which the atom-state nitrogen transmitted by the insulation or aluminum film is brought into contact with the surface and the surface is thereby nitrided.